

EXAMINER'S AMENDMENT / COMMENT

Examiner's Amendment

Examiner's amendment to the record appears below. Should the changes be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be filed no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephonic interview with James H. Morris, Reg. No. 34,681 on April 29, 2009.

In the claims:

Claims 1, 2, 8, 14-16, 18, 19, 21-23, 25, 26, and 28 are currently amended.

Claims 1, 2, 4, 5, 7-9, 11, 12, 14-16, 18, 19, 21-23, 25, 26, and 28 remain in the application.

1. (Currently Amended) A method for transferring control between a first network interface controller and at least a second network interface controller in a multiple network interface device, the method comprising:

after the first network interface controller sends a data request and an identifier associated with a memory location allocated to receive requested data in the multiple network interface device to a second device, and the identifier and an associated data field comprising the requested data are subsequently received by the second network interface controller in the multiple network interface device from the second device,

receiving, by ~~[[a]]~~ an RDMA program component of the multiple network interface device, the identifier associated with the memory location in the multiple network interface device ~~and~~ without the associated data field, from the second ~~device~~ network interface controller, wherein the second network interface controller has no knowledge of the identifier and the associated data field, and wherein the first network interface controller and the second network interface controller operate under a Remote Direct Memory Access (RDMA) protocol;

querying the first network interface controller to supply the RDMA program component with a list of valid identifiers generated by the first network interface controller and associated memory locations, wherein each identifier from the list of valid identifiers is associated with a location in a memory of the multiple network interface device;

determining, by the RDMA program component, whether the first network interface controller generated the identifier, wherein, when the first network interface controller generated the identifier, the list of valid identifiers comprises the identifier;

when it is determined that the first network interface controller generated the identifier, transmitting the memory location associated with the identifier to the second network interface controller, wherein the second network interface controller subsequently transmits the associated data field comprising the requested data to the memory location, and invalidating the identifier; and

when the identifier is not found among the list of valid identifiers, invalidating the identifier and discarding the associated data field.

2. (Currently Amended) The method of claim 1, ~~further comprising invalidating~~ wherein the identifier is invalidated under control of a bit field added to the identifier and the associated data field received from the second device.

3. (Canceled)

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4. (Previously Presented) The method of claim 1, wherein the memory is Random Access Memory.
5. (Previously Presented) The method of claim 1, wherein the program component is a computer operating system.
6. (Canceled)
7. (Previously Presented) The method of claim 1, wherein the first network interface controller and the second network interface controller operate under the RDMA protocol over TCP/IP protocol.
8. (Currently Amended) A method for transferring control between a first network interface controller and at least a second network interface controller in a host computer including the first network interface controller and the second network interface controller, the method comprising:

receiving an identifier and an associated data field in a packet from a remote computer by the second network interface controller, the identifier generated by the first network interface controller and associated with a memory location in the host computer, wherein the second network interface controller has no knowledge of the identifier and the associated data field, and wherein the first network interface controller

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and the second network interface controller operate under a Remote Direct Memory Access (RDMA) protocol;

extracting the identifier from the received packet;

after the identifier has been extracted from the received packet, passing the identifier associated with the memory location to an RDMA program component of the host computer;

querying, by the RDMA program component, the first network interface controller for a list of valid identifiers generated by the first network interface controller and associated memory locations, wherein each identifier from the list of valid identifiers is associated with a memory location in a memory of the host computer;

searching the list of valid identifiers for the identifier;

when the list of valid identifiers includes the identifier received from the remote computer, receiving, by the second network interface controller, the memory location associated with the identifier, wherein the second network interface controller subsequently transmits the associated data field to the memory location, and invalidates the identifier; and

when the list of valid identifiers does not include the identifier received from the remote computer, invalidating the identifier received from the remote computer and discarding the associated data field.

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9. (Previously Presented) The method of claim 8, wherein the identifier is invalidated under control of a bit field added to the identifier and the associated data field received from the remote computer.
10. (Canceled)
11. (Previously Presented) The method of claim 8, wherein the memory is Random Access Memory.
12. (Previously Presented) The method of claim 8, wherein the program component is a computer operating system.
13. (Canceled)
14. (Currently Amended) The method of claim 8, wherein the first network interface controller and the second network interface controller operate under the RDMA protocol over TCP/IP protocol.
15. (Currently Amended) A computer readable storage medium having stored therein instructions for performing acts for transferring control between a first network interface controller and at least a second network interface controller in a multiple network interface device, the acts comprising:

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after the first network interface controller sends a data request and an identifier associated with a memory location allocated to receive requested data in the multiple network interface device₁ to a second device₁ and the identifier and an associated data field comprising the requested data are subsequently received by the second network interface controller in the multiple network interface device from the second device,

receiving, by ~~[[a]]~~ an RDMA program component in the multiple network interface device, the identifier associated with the memory location in the multiple network interface device ~~and~~ without the associated data field₁ from the second ~~device~~ network interface controller, wherein the second network interface controller has no knowledge of the identifier and the associated data field, and wherein the first network interface controller and the second network interface controller operate under a Remote Direct Memory Access (RDMA) protocol;

querying the first network interface controller to supply the RDMA program component with a list of valid identifiers generated by the first network interface controller and associated memory locations, wherein each identifier from the list of valid identifiers is associated with a memory location in a memory of the multiple network interface device;

determining, by the RDMA program component, whether the first network interface controller generated the identifier, wherein₁ when the first network interface controller generated the identifier₁ the list of valid identifiers comprises the identifier;

when it is determined that the first network interface controller generated the identifier, transmitting the memory location associated with the identifier to the

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second network interface controller, wherein the second network interface controller subsequently transmits the associated data field comprising the requested data to the memory location, and invalidating the identifier; and

when the identifier is not found among the list of valid identifiers, invalidating the identifier and discarding the associated data field.

16. (Currently Amended) The computer readable storage medium of claim 15, wherein the identifier is invalidated under control of a bit field added to the identifier and the associated data field received from the second device.

17. (Canceled)

18. (Currently Amended) The computer readable storage medium of claim 15, wherein the memory comprises Random Access Memory.

19. (Currently Amended) The computer readable storage medium of claim 15, wherein the program component is a computer operating system.

20. (Canceled)

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21. (Currently Amended) The computer readable storage medium of claim 15, wherein the first network interface controller and the second network interface controller operate under the RDMA protocol over TCP/IP protocol.

22. (Currently Amended) A computer readable storage medium having stored therein instructions for performing acts for transferring control between a first network interface controller and at least a second network interface controller in a host computer including the first network interface controller and the second network interface controller, the acts comprising:

receiving an identifier and an associated data field in a packet from a remote computer by the ~~at least a~~ second network interface controller, the identifier generated by the first network interface controller and associated with a memory location in the host computer, wherein the second network interface controller has no knowledge of the identifier and the associated data field, and wherein the first network interface controller and the second network interface controller operate under a Remote Direct Memory Access (RDMA) protocol;

extracting the identifier from the received packet;

after the identifier has been extracted from the received packet, passing the identifier associated with the memory location to ~~[[a]]~~ an RDMA program component of the host computer;

querying, by the RDMA program component, the first network interface controller for a list of valid identifiers generated by the first network interface controller and

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associated memory locations, wherein each identifier from the list of valid identifiers is associated with a memory location in a memory of the host computer;

searching the list of valid identifiers for the identifier;

when the list of valid identifiers includes the identifier received from the remote computer, receiving, by the second network interface controller, the memory location associated with the identifier, wherein the second network interface controller subsequently transmits the associated data field to the memory location, and invalidates the identifier; and

when the list of valid identifiers does not include the identifier received from the remote computer, invalidating the identifier received from the remote computer and discarding the associated data field.

23. (Currently Amended) The computer readable storage medium of claim 22, wherein the identifier is invalidated under control of a bit field added to the identifier and the associated data field received from the remote computer.

24. (Canceled)

25. (Currently Amended) The computer readable storage medium of claim 22, wherein the memory comprises Random Access Memory.

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26. (Currently Amended) The computer readable storage medium of claim 22, wherein the program component is a computer operating system.

27. (Canceled)

28. (Currently Amended) The computer readable storage medium of claim 22, wherein the first network interface controller and the second network interface controller operate under the RDMA protocol over TCP/IP protocol.

Allowed Claims

Claims 1, 2, 4, 5, 7-9, 11, 12, 14-16, 18, 19, 21-23, 25, 26, and 28 are allowed.

Reasons for Allowance

The following is an examiner's statement of reasons for allowance:

none of the qualifying prior art references of record, taken alone or in combination, disclose or reasonably suggest: a combination of elements as claimed in independent claims 1, 8, 15, and 22, wherein the RDMA program component receives only the identifier from the second network interface controller when the second network interface controller has no knowledge of said identifier and the associated data field. As persuasively argued by applicant at page 12 of remarks, as filed: *"Craft describes passing **the whole packet** to the INIC device driver which contradicts to a purpose of the RDMA protocol". "Sending only an identifier associated with a memory location, which is actually not taught by Craft, would make processing of Craft impossible because Craft is directed to processing of **packets** by INICs. At the same time, sending STag of AAPA along with the packet of Craft will not result in limitations of claim 1 because such combination would no longer describe processing according to the RDMA protocol."* Specifically, the prior art of record fails to disclose or reasonably suggest receiving, by an RDMA program component of the multiple network interface device, the identifier associated with the memory location in the multiple network interface device without the associated data field, from the second network interface controller, as such is recited in independent claims 1 and 15 in combination with the other claim elements;

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and after the identifier has been extracted from the received packet, passing the identifier associated with the memory location to an RDMA program component of the host computer, as such is recited in independent claims 8 and 22 in combination with the other claim elements.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to OLEG SURVILLO whose telephone number is (571)272-9691. The examiner can normally be reached on M-Th 8:30am - 6:00pm; F 8:30am - 5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Caldwell can be reached on 571-272-3868. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/Andrew Caldwell/

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